

Citation:

Duffey KJ, Gordon-Larsen P, Jacobs DR Jr, Williams OD, Popkin BM. Differential associations of fast food and restaurant food consumption with 3-y change in body mass index: The Coronary Artery Risk Development in Young Adults Study. *Am J Clin Nutr*. 2007 Jan; 85 (1): 201-208.

PubMed ID: [17209197](#)

Study Design:

Prospective Cohort Study

Class:

B - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

- To assess the cross-sectional associates of year seven (and year 10) of fast food and restaurant food consumption with year seven (and year 10) body mass index (BMI)
- To assess the effects of year seven fast food and restaurant food consumption on year 10 BMI
- To examine the change in restaurant and fast food consumption on change in BMI
- To investigate the effects of increasing weekly consumption of fast food compared with restaurant food relative to increases in both restaurant and fast food use.

Inclusion Criteria:

- Persons with no missing values on data for outcomes, exposure and any covariate were used in the present analysis
- Additional inclusion criteria were described in previous publications.

Exclusion Criteria:

Exclusion criteria are described in previous publications.

Description of Study Protocol:**Recruitment**

- Participants were recruited from four urban areas, including:
 - Chicago, IL
 - Birmingham, AL
 - Minneapolis, MN
 - Oakland, CA
- Specific recruitment procedures are described in previous publications.

Design

- Prospective cohort analysis using year seven and year 10 data from the Coronary Artery Risk Development in Young Adults (CARDIA) Study
- This study is a prospective cohort study of the determinants and evolution of cardiovascular disease risk factors among young adults.

Dietary Intake/Dietary Assessment Methodology

Fast food and restaurant food consumption frequency was assessed using a questionnaire and open-ended questions.

Statistical Analysis:

- Descriptive statistics were computed for frequency of restaurant and fast food consumption, total energy intake and demographic variables. Percentages were calculated for categorical variables and means and standard errors for continuous variables
- Multivariate linear models were used to estimate the cross-sectional and longitudinal association between fast food or restaurant use and BMI
- For cross-sectional analyses, fast food and restaurant use were regressed on BMI while controlling for race, sex, age, education, family structure, study center, physical activity, baseline calories and smoking status
- Longitudinal association models were controlled for race, sex, age, study center, baseline measures of education, total caloric intake, physical activity, family structure and smoking status.

Data Collection Summary:

Timing of Measurements

- Baseline measurements were taken in 1985 to 1986
- Follow-up examinations were conducted in 1987 to 1988, 1990 to 1991, 1992 to 1993 (year seven), 1995 to 1996 (year 10) and 2000 to 2001 (year 15)
- For the present study, data from years seven and 10 were used.

Dependent Variables

- BMI was calculated using measurement height and weight
- Change in BMI was determined to be the difference between year seven and year 10 BMI.

Independent Variables

Away-from-home eating at fast food establishments and restaurants was assessed using the open-ended questions:

- "How often do you eat breakfast, lunch or dinner in a place such as McDonald's, Burger King, Wendy's, Pizza Hut or Kentucky Fried Chicken?"
- "How many times in a week or month do you eat breakfast, lunch, or dinner at a restaurant or cafeteria?"

Control Variables

- Race

- Sex
- Age
- Study center
- Baseline measures of education, total caloric intake, physical activity, family structure and smoking status.

Description of Actual Data Sample:

- *Initial N*: 5,115 participants aged 18 to 30 years, who were enrolled at baseline
- *Attrition (final N)*: 3,394
- *Age*:
 - Average age at year seven was 25 years
 - Average age at year 10 was 28 years
- *Ethnicity*: 47% African American
- *Other relevant demographics*: Levels of education were
 - 5% less than high school
 - 22% had a high school degree
 - 73% had more than a high school education
- *Anthropometrics*: Average BMI at years seven and 10 was 27kg/m²
- *Location*: United States.

Summary of Results:

Cross-Sectional and Year Seven Intake with Year 10 BMI Models

- For year seven and 10, fast food consumption was positively associated with BMI in the corresponding year
- Each one unit increase in fast food consumption (one time a week) was associated with a 0.13 increase in BMI at year seven (95% CI 0.04 to 0.22, P=0.003) and a 0.24 increase in BMI at year 10 (95% CI 0.13 to 0.35, P=0.0001)
- Restaurant consumption was not associated with BMI at year seven or at year 10.

Longitudinal Change Models

- Increased consumption of fast food was associated with a positive increase in BMI change over the three-year period (0.0488, 95% CI 0.01 to 0.09, P=0.016)
- Increased restaurant food consumption was not associated with changes in BMI over the three-year period.

Author Conclusion:

- Fast food and restaurant consumption have differential cross-sectional and longitudinal effects on BMI
- Greater fast food, but not restaurant food intake was associated with higher current BMI and greater increase in BMI over a three-year time period
- The authors concluded that greater fast food, but not restaurant food consumption is associated with higher BMI.

Reviewer Comments:

Limitations of the current study, as noted by the authors, include:

- *Self-reported data on away-from-home food consumption and other lifestyle factors*
- *The observational nature of the study raises the possibility of residual confounding or co-linearities that limit statements of causality*
- *Short-time span of follow-up*
- *Assessment of away-from-home food intake at only two time points of the longitudinal study, years seven and 10.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1.	Was the research question clearly stated?	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	Was the selection of study subjects/patients free from bias?	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	No
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes

2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	No
4.1.	Were follow-up methods described and the same for all groups?	No
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	No
4.4.	Were reasons for withdrawals similar across groups?	???
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes

5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	No
6.6.	Were extra or unplanned treatments described?	No
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	No
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes

8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	Is bias due to study's funding or sponsorship unlikely?	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes